# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

# *Certificate of Accreditation*

*Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:*

## *Calidad Mx, S.A. de C.V.*

***Plutarco Elías Calles 3030-1, Col. Riveras del Rio,***
***Guadalupe, Nuevo León, México. 67160***

*(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:*

## ISO/IEC 17025:2005

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system
(as outlined by the joint ISO-ILAC-IAF Communiqué dated January 2009):

## *Dimensional, Optical, Chemical, Volume, Thermodynamic, Mechanical, Time & Frequency, and Mass, Force and Weighing Devices*

***(As detailed in the supplement)***

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President/Operations Manager

| *Initial Accreditation Date:* | *Issue Date:* | *Expiration Date:* |
|---|---|---|
| July 14, 2011 | December 04, 2015 | January 31, 2018 |

| *Accreditation No.:* | *Certificate No.:* |
|---|---|
| 70242 | L15-401 |

Perry Johnson Laboratory Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

*The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: www.pjlabs.com*

# *Certificate of Accreditation: Supplement*

**Calidad Mx., S.A. de C.V.**
Plutarco Elías Calles 3030-1, Col. Riveras del Rio, Guadalupe, Nuevo León 67160
Contact: Alejandro Lujan Phone: 818-379-2710

*Accreditation is granted to the facility to perform the following calibrations:*

Dimensional

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| Caliper[FO] | 0.105 in to 12 in | (424.13 + 20.76L) µin | Mitutoyo Gage block, Grade 0 |
| Micrometer[FO] | 0.105 in to 12 in | (61.04 + 23.76L) µin | Mitutoyo Gage block, Grade 0 |
| Coating Thickness Gauge[FO] | 1 000 µin to 60 000 µin | (2.18 + 1.44 x $10^{-3}$ L) µin | Elcometer Certified Thickness Standards |
| Tape[FO] | 500 cm maximum | 0.2 cm | Standard Tape |
| Rule[FO] | 100 cm maximum | 0.2 cm | Standard Rule |
| Sieves[F] | 120 g (100 µm to180 µm) | 2 % of reading | Direct Comparison by Weight, Standard Reference Material (SRM) CENAM |
| | 360 g (180 µm to 2 000 µm) | 2 % of reading | Direct Comparison by Weight, Standard Reference Material (SRM) CENAM |

Optical

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| ρ (λ) Spectral Reflectance[FO] | ρ: 360 nm to 740 nm 0% to 100% | 2.5 % of reading | White Standard Tile |
| | X: 0.3 to 95 | 0.6 Units | |
| | Y: 0.3 to 100 | 0.6 Units | |
| | Z: 0.3 to 100 | 0.6 Units | |
| | Color Values: | | |
| | 0 to 100 | 0.7 Units | |
| CIE L: | -28 to 36 | 0.7 Units | |
| CIE a*: CIE b*: | -26 to 73 | 0.7 Units | |
| Transmittance Density[FO] | 0.25 % do to 4.0 % do | 0.02 % do | Density Filter Standard |
| Spectrophotometers Transmittance[FO] | τ: 1 % to 95 % | 0.27 % of reading | Neutral density Filters, Holmium Oxide Glass |
| | λ: 230 nm to 700 nm | 0.5 nm | |
| ρ (e): *Gloss/Specular Reflectance Angle of Incline [FO] | | | |
| ρ (e): | 20º to 92.1º | 0.5 Gloss Units | Ceram Research Gloss and Semi-Gloss Standards |
| ρ (e): | 60º to 94.9º | 0.4 Gloss Units | |
| ρ (e): | 85º to 99.8º | 0.4 Gloss Units | |

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Contact: Alejandro Lujan Phone: 52-818-379-2710

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Optical

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| Eν Illuminance[O] | 100 lux to 3 000 lux | 2 % of reading | Luxometer |
| Eν Light Color[F] | 60 K to 2 856 K | 20 K | |
| Eν Light Meters[F] | 100 lux to 3 000 lux | 2 % of reading | |

Chemical

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE (AND SPECIFICATION WHERE APPROPRIATE) | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| pH Meters[FO] | 4 pH to 10 pH | 0.1 pH | NIST Traceable Standards, (pH Buffer, 4.01, 7.01, 10.01) |
| Conductivity Meters Fixed points[FO] | 84 µS/cm | 1 µS/cm | NIST Traceable standards HANNA |
| | 1 413 µS/cm | 7 µS/cm | |
| | 5 000 µS/cm | 20 µS/cm | |
| | 12 800 µS/cm | 64 µS/cm | |
| Turbidity[FO] | 1 NTU to 20 NTU | 0.5 NTU | NTU EPA Method 180.1, HACH Standard |
| | 20 NTU to 100 NTU | 1 NTU | |
| | 100 NTU to 800 NTU | 5 NTU | |
| | 800 NTU to 4 000 NTU | 41 NTU | |
| Relative Humidity[FO] | 10 % RH to 98 % RH | 3.2 % RH | Satured Salt Solution, OIML R-121 |
| Refractive Index[FO] | 1°Brix to 80 °Brix | 0.55 % of reading | Sucrose Standards, OIML R-108 |

Volume

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| Burette[F] | 10 mL | 14 µL | Analytical Balance, 0.1 mg |
| | 25 mL | 35 µL | |
| | 50 mL | 50 µL | |
| Volumetric Pipettes[F] | 1 mL | 3.3 µL | |
| | 5 mL | 3.3 µL | |
| | 10 mL | 3.3 µL | |
| | 25 mL | 5.3 µL | |
| Micropipettes[F] | 1 µL | 0.023 µL | Micro Analytical Balance (res.= 0.000 001 g) |
| | 2 µL | 0.023 µL | |
| | 5 µL | 0.059 µL | |

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Volume

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| Micropipettes[F] | 500 µL | 1.7 µL | Microbalance<br>Mod. AD-4212B-PT<br>Water as a reference standard<br>(res.= 0.000 001 g) |
| | 1 000 µL | 3.7 µL | |
| | 2 000 µL | 6.8 µL | |
| Graduated Cylinder[F] | 10 mL | 1.2 mL | Balance<br>Mod. HR-200<br>(res.= 0.000 1 g)<br>From 200 ml to 2 000 ml<br>Balance Lutron GM-1500P<br>1 000 g X 0.01g<br>1 500 g X 0.05g |
| | 25 mL | 1.2 mL | |
| | 50 mL | 1.2 mL | |
| | 100 mL | 1.2 mL | |
| | 200 mL | 1.8 mL | |
| | 250 mL | 1.9 mL | |
| | 500 mL | 3 mL | |
| | 1 000 mL | 4.2 mL | |
| | 2 000 mL | 8.1 mL | |
| Volumetric Flask[F] | 10 mL | 0.01 µL | Precision Balance<br>From 10 ml to 100 ml<br>Balance<br>Mod. HR-200<br>(res.= 0.000 1 g)<br>From 200 to 2000 ml<br>Balance Lutron GM-1500P<br>1000 g X 0.01g<br>1500 g X 0.05g |
| | 25 mL | 0.01 µL | |
| | 50 mL | 0.02 µL | |
| | 100 mL | 0.03 mL | |
| | 250 mL | 0.07 mL | |
| | 500 mL | 0.08 mL | |
| | 1 000 mL | 0.15 mL | |
| | 2 000 mL | 0.33 mL | |
| Containers | 10 L | 0.7 mL | Balance<br>From 10 lt to 200 lt<br>Mettler Toledo Scale Mod. IND 425<br>60 kg X 0.001 kg |
| | 20 L | 0.7 mL | |
| | 50 L | 0.7 mL | |
| | 100 L | 1.7 mL | |
| | 200 L | 1.7 mL | |

Time & Frequency

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| Stop Watch[F] | 60 s to 86 400 s | 16 s/day | Direct Comparison Stop Watch, UTC |
| Tachometer[F] | 1 rev/min to 10 000 rev/min | 2 % of reading | Tachometer |

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Mechanical

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| Pressure[FO] | 1 psi to 1 000 psi | 1 % of reading | Omega DPG8000-100 |
| Dynamic Viscosity Meters[FO] | 0.1 Pa·s to 30 Pa·s | 0.6 % of reading | Cannon Standard OIL |
| Kinematic Viscosity Ford Cups[FO] | 26 mm²/s to 367 mm²/s | 2.5 % of reading | |
| No. 2 (Flow time: 18 sec)[FO] | 1.44 mm²/s | 2.5 % of reading | |
| No. 3 (Flow time: 6.58 sec)[FO] | 2.31 mm²/s | 2.5 % of reading | |
| No. 4 (Flow time: 4.49 sec)[FO] | 3.85 mm²/s | 2.5 % of reading | |
| No. 5 (Flow time: 2.0 sec)[FO] | 12.1 mm²/s | 2.5 % of reading | |
| Kinematic Viscosity Zahn Cups[FO] | 20 mm²/s to 1 400 mm²/s | 2.5 % of reading | |
| No. 2 (Flow time: 14 sec)[FO] | 3.5 mm²/s | 2.5 % of reading | |
| No. 3 (Flow time: 7.5 sec)[FO] | 11.7 mm²/s | 2.5 % of reading | |
| No. 4 (Flow time: 5.0 sec)[FO] | 14.8 mm²/s | 2.5 % of reading | |
| No. 5 (Flow time: 23 sec)[FO] | 23 mm²/s | 2.5 % of reading | |
| Pressure Gage[F] | 1 000 psi to 10 000 psi | 2 % of reading | Digital Manometer CENAM Technical Guide |
| Torque[F] | 2 N·m to 500 N·m | 1 % of reading | Torque Transducer CEDAR Mod. DIS-IP500 500 N-m |

Mass, Force and Weighting Devices

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| Analytical Balance[O] | 1 mg to 200 g (Res. = 0.1 mg) | $(2 \times 10^{-4} + 5.21 \times 10^{-6}\text{Wt})$ g | OIML F1 Weights |
| Precision Balance[O] | 0.1 g to 6 000 g (Res = 0.01 g) | $(1.16 \times 10^{-2} + 3.35 \times 10^{-6}\text{Wt})$ g | |
| Scale[O] | 5 kg to 200 kg (Res. = 1 g) | $(1.142\ 9 + 2.45 \times 10^{-6}\text{Wt})$ g | OIML M2 Weights |
| Mass Class F1, M1 Weights[F] | 0.1 g | 0.05 mg | Class E2 Mass Micro Analytical Balance |
| | 0.5 g | 0.05 mg | |

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Mass, Force and Weighting Devices

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|---|---|---|---|
| Mass<br>Class F1, M1 Weights[F] | 1 g | 0.08 mg | Class E2 Mass Micro Analytical Balance |
| | 10 g | 0.08 mg | |
| | 20 g | 0.08 mg | |
| | 50 g | 0.12 mg | |
| | 100 g | 0.21 mg | |
| | 200 g | 0.6 mg | |
| Class M1, M2 Weights[F] | 1 kg | 12 mg | Class F1 Mass Precision Balance |
| | 2 kg | 14 mg | |
| | 5 kg | 31 mg | |
| Class M2, M3 Weights[F] | 10 kg | 170 mg | Class M1 Mass Balance |
| | 20 kg | 230 mg | |
| Weighing Devices[O] | 200 kg to 2 000 kg (Res = 0.5 kg) | $(5.85 \times 10^{-1} + 3.1 \times 10^{-5} Wt)$ kg | Class M2 Mass |

Thermodynamic

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE | CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED |
|---|---|---|---|
| Thermocouple K[FO] | 0 °C to 500 °C | 1 °C | HANNA HI 93530N, Dry Block |
| | 501 °C to 1 100 °C | 1.2 °C | Furnace TC TYPE K |
| Thermocouple J[FO] | 0 °C to 500 °C | 1 °C | HANNA HI 93530N, Dry Block |
| | 501 °C to 1 100 °C | 1.2 °C | Furnace, TC TYPE K |
| Temperature Controllers[FO] | 0 °C to 500 °C | 1 °C | HANNA HI 93530N, Dry Block |
| | 501 °C to 1 100 °C | 1.2 °C | Furnace, TC TYPE K |
| IR Thermometer[F] | 50 °C to 500 °C | 2.6 °C | Fluke 724<br>Black Body (Temperature Generator |
| Bimetallic Thermometer[F] | -20 °C to 500 °C | 1.2 °C | Dry Well Fluke 724<br>Freezer |
| Temperature Generation: Ovens, Furnaces, Muffles, Freezers[F] | -20°C to 0 °C | 1.4 °C | Fluke 724 |
| | 0 °C to 25 °C | 1.4 °C | |
| | 25 °C to 100 °C | 1.5 °C | |
| | 100 °C to 450 °C | 1.7 °C | |
| | 450 °C to 900 °C | 1.9 °C | |

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*Accreditation is granted to the facility to perform the following calibrations:*

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor *k* (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.
2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.
3. The presence of a superscript F means that the laboratory performs calibration of the indicated parameter at its fixed location. Example: Outside Micrometer$^{F}$ would mean that the laboratory performs this calibration at its fixed location.
4. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations. Example: Outside Micrometer$^{O}$ would mean that the laboratory performs this calibration onsite at the customer's location.
5. The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer$^{FO}$ would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.
6. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.
7. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
8. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.